DOCUMENT RESUME

ED 115 720 UD 015 638

AUTHOR	Sorensen, Aage B.; Fuerst, Sarah
TITLE	Black-White Differences in the Occurrence of Job Shifts.
INSTITUTION	Wisconsin Univ., Madison. Inst. for Research on Poverty.
SPONS AGENCY	Department of Health, Education, and Welfare, Washington, D.C.
REPORT NO	IRP-261-75
PUB DATE	Oct 75
NOTE	37p.; Discussion Paper
EDRS PRICE	MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS	Economically Disadvantaged; *Employee Attitudes; *Employment Patterns; Employment Problems; Employment Trends; Income; *Negro Employment; *Occupational Mobility; Race Influences; *Racial Differences; Racial Discrimination; Racial Factors; Social Disadvantagement; Socioeconomic Status; Unemployment

ABSTRACT

This paper presents an analysis of black-white differences in job shifts based on panel data. Three topics are investigated: (1) whether a person intended to quit (a person's intention to quit); (2) whether or not a person actually quit his job; and (3) whether or not a person was laid off. The outcome of these events is analyzed in relation to income derived from the job and the education, age, marital status, and number of children of the job-holder. It is hypothesized that if job shifts represent an interplay between personal characteristics and structural opportunities, then occupational discrimination toward blacks should be reflected in the job shifts blacks undertake. Results demonstrate a pattern where blacks are systematically disadvantaged in their income attainment process in relation to whites. It is shown that while blacks and whites form their intention to quit in much the same way, actual quits and lay-offs take place according to very different mechanisms for blacks and whites. (Author/AM)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

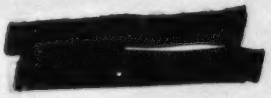
ED115720

UD 015 638

261-75

INSTITUTE FOR RESEARCH ON POVERTY DISCUSSION PAPERS

BLACK-WHITE DIFFERENCES IN THE OCCURRENCE OF JOB SHIFTS



Aage B. Sørensen and
Sarah Fuerst

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

UNIVERSITY OF WISCONSIN MADISON

UD015 638

BLACK-WHITE DIFFERENCES IN THE OCCURRENCE OF JOB SHIFTS

Aage B. Sϕrensen

and

Sarah Fuerst

October 1975

The research reported here was supported by funds granted to the Institute for Research on Poverty at the University of Wisconsin-Madison by the Department of Health, Education, and Welfare pursuant to the Economic Opportunity Act of 1964. The conclusions expressed herein are solely those of the authors.

BLACK-WHITE DIFFERENCES IN THE OCCURRENCE OF JOB SHIFTS

I. Introduction

Despite the long-standing interest of sociology in social mobility, the analysis of job shifts has not received much attention in sociological research. This is despite the fact that job shifts are, in a sense, the most basic form of career mobility; that is, whatever changes can be observed over time in a person's occupational career will be a result of the job shifts he has undertaken. But most research on mobility has not been concerned with analyzing careers; it has focused on comparing the occupational positions of fathers and sons. On the other hand, status attainment research that is concerned with the outcome of occupational careers has tended to ignore the fact that these careers represent mobility processes.

It is useful to ignore a phenomenon when it is not particularly relevant to the objectives pursued in an analysis. Traditional intragenerational mobility research is largely concerned with characterizing social systems by their rate of mobility, these rates in turn to be explained by other characteristics of society such as the level of industrialization. Analysis of individual job shifts are indeed quite irrelevant to this endeavor. Status attainment research has been largely concerned with modeling the interplay among various individual characteristics, especially educational and family background, for the level of status and income a person obtains. For this

endeavor, also the analysis of job shifts may seem quite irrelevant. But status attainment research has also focused much attention on the magnitude of the effects of individual attributes on status and income, especially the effect of education (see, for example, Jencks et al., 1972). Such concern demands some insight into the sources of variation in the parameters of the status attainment model, to be obtained from an analysis of the process that generates status and income.[1] For this purpose, the analysis of job shifts is highly relevant.

The importance of job shifts for the process of status and income attainment derives from the fact that they are the basic mechanisms for change in income and status. Change in status, as measured by occupational prestige, can only take place through job shift. Major changes in income, apart from real and inflationary increases, will usually demand job shift to the extent that income is derived from labor. Hence the level of status and income of a person at a point in time that forms the dependent variable in status attainment research will be determined by the job shifts a person undertakes. The circumstances that determine the outcomes of job shifts therefore will determine how much status and income a person with given characteristics (education, family background, race, etc.) obtains in the labor market.

Job shifts are made either on the job holder's own decision, in which case we shall refer to them as quits, or they represent the employer's decision to terminate the employment, in which case we shall speak of them as layoffs. The occurrence of both quits and layoffs

represents an interplay between characteristics of individuals and characteristics of the labor market they face. Quits occur when a better job is available for the individual. Their occurrence, therefore, is a question of how good a job a person already has obtained, given his training, skills, and experiences, and of the existence of better jobs that are vacant. Layoffs occur when a person is no longer needed by the firm. There will be personal characteristics that will determine how expendable a person is; a layoff obviously represents a response to certain employment conditions. To the extent that persons are maximizing income and status a quit may be expected to result in an increase in occupational achievement, while a layoff may be expected to result in a loss. Whether a job shift is a quit or a layoff therefore determines whether the level of status and income a person obtains will increase or decrease. The study of job shifts in this way enables us in determining status and income, to analyze the interplay between personal characteristics relevant for a person's employment opportunities and these opportunities.

The insight that the analysis of job shifts may give about the basic mechansims involved in the process of status and income attainment constitute the rationale for attempting an analysis of the occurrence of job shifts here.[2] The analysis will fall into three parts--first, an analysis of persons' intentions to quit, then an analysis of the actual quits, and finally an analysis of layoffs will be presented. The analysis will be limited to the occurrence of job shifts. A logical next step is the analysis of the outcome of job

shifts, that is, the magnitudes of gains or losses persons realize in their job shifts.

The well-known differences in occupational achievement of blacks and whites have been shown partly to be explainable by differences in levels of occupational resources, as measured by education and family background. However, a substantial portion of the difference in achievement is not explained by different levels of resources, but seems to be caused by a lower efficacy of occupational resources for blacks than for whites; that is, blacks obtain a lower occupational return on education and family background than do whites (Siegel, 1965; Duncan, 1969; Coleman et al., 1972). This difference is usually interpreted to represent occupational discrimination. If, as we argue, job shifts represent interplay between personal characteristics and structural opportunities, this occupational discrimination toward blacks should be reflected in the job shifts blacks undertake. Black-white comparisons are therefore carried out throughout this paper.

II. Data and Variables

Data for the analysis of job shifts were obtained from "A Panel Study of Income Dynamics," James S. Morgan, principal investigator, conducted at the Survey Research Center, University of Michigan. This five-year panel study provides data on income and employment position conditions for a national sample of families. The information used in this paper pertains to the employment status and personal

characteristics of male family heads collected in 1971, and information on change in employment conditions in the year 1971 collected in 1972. Only those male family heads who were part of the sample in both years, and in the labor force for both years, are included in the present analysis. The study gives information on 1701 whites and 701 blacks.

As mentioned in the introduction, job shifts may be seen as an interplay between personal characteristics relevant for a person's employment opportunities and these opportunities. The variables relevant for the analysis then would be (1) measures of personal occupational resources that reflect a person's ability, skills, and experience, and (2) measures of occupational returns, that is, variables that reflect how good a job a person has obtained. We expect that a person's likelihood of getting fired or quitting will be related to how good a job a person has obtained in relation to his occupational resources: high resources relative to current returns should increase the likelihood of quitting; low resources relative to current returns may be expected to increase the likelihood of getting fired. To these variables two other groups may be added: (3) measures of personal constraints that are individual characteristics that reduce a person's ability to utilize existing job opportunities, and (4) measures of structural constraints that are nonindividual variables such as the level of employment and the distribution of job opportunities. In other words, given a person's resources and current returns there will be personal constraints relevant to his possibilities in taking advantage of opportunities for better jobs, and structural variables that determine the likelihood of getting fired and the availability of vacant jobs.

Information on all four groups of variables is available in the study, but this information is not very complete. The only direct measure of occupational resources available is respondent's education. There are no measures of on-the-job training, and experience, or direct measures of ability available, nor are measures of family background available. A number of different family and personal income measures were present. The measure used in this paper is the male head's earnings from work in 1971. Measures of occupational status and job satisfaction that could be relevant indicators of occupational returns were not available. Measures of personal constraints on the ability to utilize job opportunities were age, marital status, number of children, and homeownership. With respect to all these variables it seemed reasonable to expect that they would reflect constraints on a person's freedom to move. It is, however, possible that especially age and marital status also partly reflect personal resources. Further discussion of these interpretative possibilities will be given in the analysis. Finally, overall measures of employment in the county of residence are available as a measure of structural constraints. Unfortunately the analysis with this measure of level of employment did not produce reliable results. The measure does not seem to be a reliable indicator of the employment conditions facing the individual respondents. Analysis using this measure will therefore not be presented.

The available information can be used to analyze three types of events: first, whether the respondents in 1971 intended to find a new

job in the following year; second, whether the respondent actually did quit; and third, whether he was laid off or not. For the analysis of quits, respondents who were laid off were excluded. Only one job change per year was recorded in the study. This means that multiple job changes in a year, even if they did occur, could not be treated. Nor could it be determined whether both a layoff and a quit occurred in the same year. It is thus impossible to tell whether the wages reported in 1971 did in fact come from the job a person subsequently quit or was fired from, although this in most instances should be the case. The fact that the information on whether a job change was a quit or a layoff was supplied by the respondent may also influence the results. It might be less stigmatizing to report a quit, even if a layoff did in fact occur.

Quits and layoffs are dichotomous events, and intentions to quit were coded in that way. A multivariate analysis was desired. A linear least squares analysis with a dichotomous dependent variable is both an inappropriate and an inefficient method of analysis. The solution to this problem adopted here is described next.

III. Methods of Analysis

The dependent variable in the following analysis is coded "1" if the event occurred, "0" if it did not occur. For a group of respondents, the variable to be explained becomes the probability that an event will occur. Suppose that there are n groups of respondents

characterized by n-values of the independent variable. Denote the values of the dependent variables (either 0 or 1) for a particular group y_j.

A linear model for y_j would be

$$y_j = b_j X_j + \varepsilon_j \qquad j = 1...n \tag{1}$$

where x_j is the jth value of the independent variable and ε_j random disturbance with expectation 0.

There are a number of problems with this specification. First the estimates obtained from least squares information of 1 will be inefficient. Since y_j is binomially random, the variance of the error term ε_j will depend on j, that is,

$$\text{var}(Y_j|X_j) = \text{var}(\varepsilon_j) = b_j X_j (1 - b_j X_j) . \tag{2}$$

The variance in ε_j is heteroscedastic and the estimates therefore inefficient. This means that the use of equation (1) is a particularly unreliable method of estimating the effect of independent variables on the probability that an event occurs.

Equation (1) is also a likely inappropriate theoretical specification. The relationship between an independent variable and the probability that an event occurs must be such that the greater the value of the independent value the closer this probability is to 1, and the smaller the value of the independent variable the closer it is to 0. But the probability that an event occurs can never exceed 1 or be less than 0. The theoretical relationship between the independent variable

and the probability that an event occurs will therefore be nonlinear, likely of the form indicated in Figure 1 (Nerlove and Press, 1973).

A linear specification of the probability function is indicated in Figure 1 by the broken line. It is likely that this would be a reasonable approximation to the true function if the probability of an event is around .5. But if the probability is either very small or large, the linear approximation will be quite bad. The events studied in this paper are infrequent and the linear model is therefore likely to be unreasonable.

Another indication of the inappropriateness of this linear probability model has been pointed out by Theil (1967). While the dependent variable cannot lie outside the interval 0 to 1, there is nothing in the linear model that constrains the predicted values from the model so that they always fall within this interval. Predicted values in excess of 1 or negative values can thus occur with this specification; even they are meaningless.

There are several solutions to these problems proposed in the literature. They all involve transforming the probability p_j so that the new quantity is not constrained to vary between 0 and 1. One solution widely accepted in biological research is the probit specification. In this paper we use the so-called logit specification, treated by Goodman (1972) and Theil (1967), among others. This solution relies on the transformation

$$\text{logit} = \log \frac{p_j}{1-p_j} \quad . \tag{3}$$

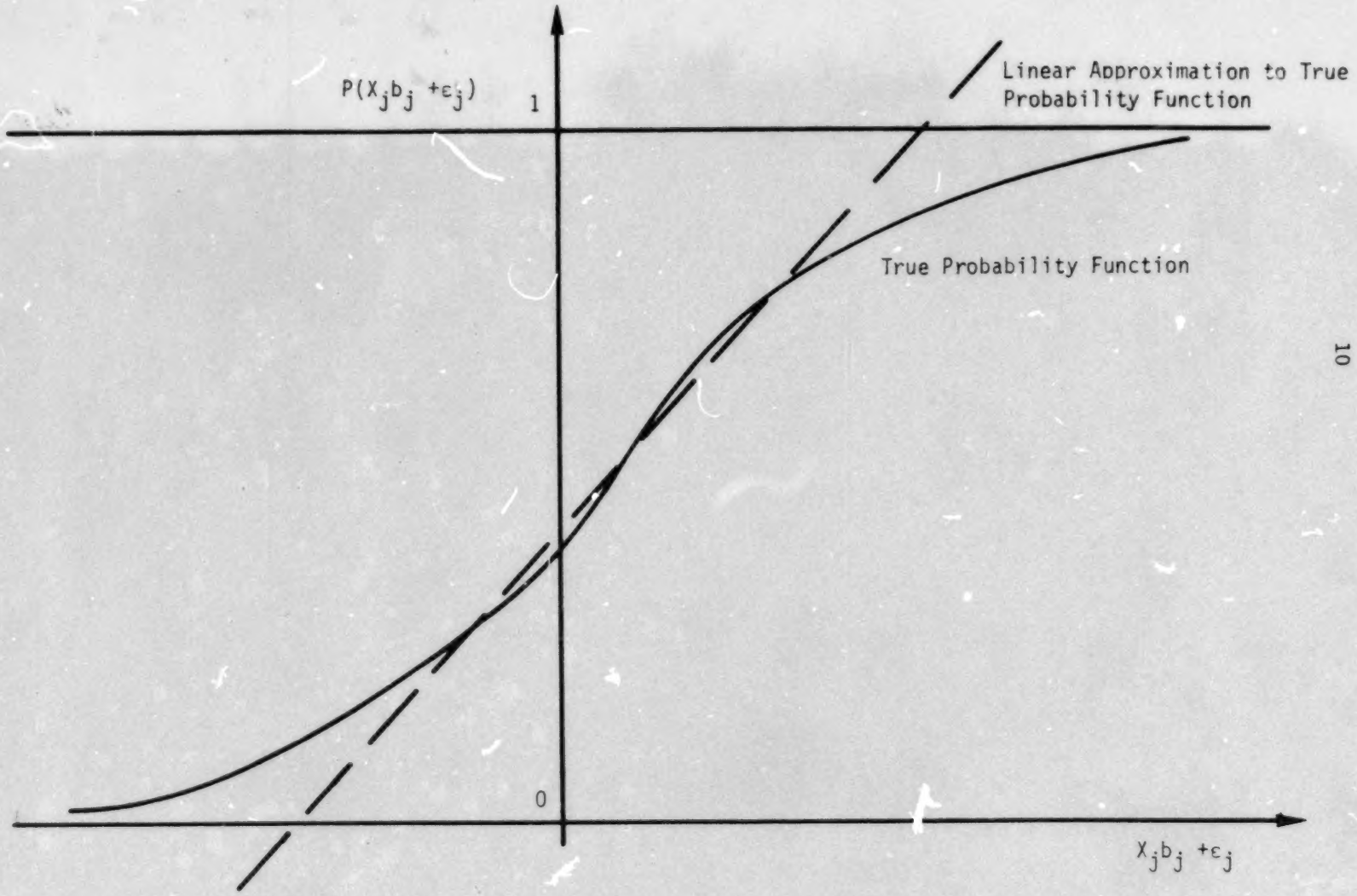


Figure 1 LINEAR APPROXIMATION TO TRUE PROBABILITY FUNCTION

The logit then is the logarithm of the odds that an event occurs, or the probability that it will occur over the probability that it will not. The logit will vary between $-\infty$ and ∞ and the problems imposed by the constraint on the dependent variable and the linear probability model is thus avoided.

In the logit specification our model would be

$$\log \frac{p_j}{1 - p_j} = b_j X_j + \varepsilon_j \qquad (4)$$

where the interpretation of b_j is slightly different from the linear probability model 1, in that here b_j measures the effect of the independent variable on the log of the odds that an event occurs, while before it measured the direct effect on the probability. The logit is a monotonic transformation of p_j, so that this difference is, at least for our purposes, insignificant.

The logit specification however has one important drawback. The logit cannot be computed when there is only one observation per cell. Hence the least squares or weighted least squares estimation of (4) is impossible unless the continuous independent variables are categorized. However, Nerlove and Press (1973) have developed a solution to this problem. Solving for p_j in (4) gives

$$p_j = \frac{1}{1 + e^{-(b_j X_j + \varepsilon_j)}} \cdot \qquad (5)$$

Nerlove and Press developed a maximum likelihood estimation of the coefficients in (5) based on the standard logistic cumulative

distribution function. The computer program developed by them to obtain this solution has been used here, with minor modifications.[3]

The program developed by Nerlove and Press provides an χ^2 test of the specified model and the individual coefficient. Tests are obtained as the likelihood ratio or the value of the maximum likelihood function of the model to be tested over the value of the maximum likelihood function of the model to be used as a standard. When the sample size is not too small, -2λ is distributed as χ^2, where λ is the likelihood ratio.

The printout from the program provides .95 confidence intervals for the parameters. These confidence limits are used here to evaluate the difference between coefficients to the same variable in the two populations studied (blacks and whites). This is a somewhat conservative procedure in that differences that might have been established as significant using a direct test might not be detected using the overlap of confidence intervals as a criterion. However the statistics needed to comput direct tests were not provided by the version of the program used here.

IV. A Model for Quits

Persons are expected to quit if a better job is available to them. The decision to seek out better jobs was argued above to be influenced by their occupational resources and the returns they obtained from the job they currently hold. It is necessary to specify more closely what is meant by this statement before we can proceed

with the analysis. Denote by y a measure of the intention to quit a job. That the desire to quit a job is dependent on a person's resources and the returns he obtains, may be taken to mean that a discrepancy D, between resources and returns, determines the desire to quit in a linear fashion

$$y = a_0 + a_1 D \tag{6}$$

where a_0 represents unmeasured variables that influence the desire to quit, and a_1 measures how strongly the discrepancy influences the desire to quit. The size of a_1 may, other things being equal, be assumed dependent on the level of opportunities for better jobs: The better those opportunities, the larger effect the discrepancy will have on the desire to quit.

The exact dependency of D on resources and returns could be specified in several ways. The simplest formulation is the linear difference between potential returns (R_p) and actual return (R_a), or

$$D = R_p - R_a \,. \tag{7}$$

The two quantities would in turn be functions of a person's resources and the returns he obtains from his current job. Denote by Z a person's overall level of resources, then $R_p = b_0 + b_1 Z$ where b_1 is the parameter that converts personal resources into potential returns. The variable Z in turn may be assumed to be a

linear function of a set of specific measures of resources.

$$Z = k_0 + \sum_{i=1}^{n} k_i E_i \quad . \tag{8}$$

where the E_i's are measures of training, ability, motivation, and other personal characteristics relevant for a person's value in the job market, and the k_i's are coefficients that express their contribution to the overall level of resources. In the data used here only one direct measure of occupational resources is available--education. Hence R_p becomes

$$R_p = b_0' + b_0'E \tag{9}$$

where b_0' and b_1' cannot be assumed identical to b_0 and b_1 because of the omission of variables. It is furthermore important to note that R_p in the analysis of intentions to quit is the person's perceived potential returns in the labor market, and b_1' therefore would be a coefficient that expresses how important a person believes education is for his value in the job market.

The person's actual returns can be assumed to be a function of a person's specific current returns: income status, job satisfaction, etc.; or,

$$R_a = d_0 + \sum_{i=1}^{n} d_i I_i \quad . \tag{10}$$

Again only one measure of returns is available, so that equation (10) becomes

$$R_a = d_0' + d_1' I \tag{11}$$

and d_1' will express the perceived importance of income for the overall returns.

Substituting (9) and (11) into (6) one obtains

$$D = b_0' - d_0' + b_1'E - d_1'I \tag{12}$$

No direct measure of D is available, but equation (12) can be substituted into (6) to give

$$y = a_0 + b_0' - d_0' + a_1b_1E - a_1d_1I \tag{13}$$

or

$$y = c_0 + c_1E - c_2I \tag{14}$$

where $c_0 = a_0 + b_0' - d_0'$

$c_1 = a_1b_1'$

$c_2 = a_1d_1'$

Equation (10) can be estimated using education and income as independent variables. But the coefficients c_1 and c_2 are both functions of the importance of a discrepancy between resources and returns for the intention to quit given by a_1, and of the perceived importance of education for the potential returns a person will be able to obtain and the perceived contribution income makes to total current returns. With no direct measure of D the absolute magnitudes of a_1 and b_1 cannot be identified.

There are other identification problems with (10). Suppose it is argued that in addition to the effect of a discrepancy on the intention to quit, there are independent effects of resources and returns. One might argue that education irrespective of current returns increases the likelihood of quitting and that higher income irrespective of education decreases the likelihood of quitting. The resulting equation would be

$$y = k_0 + k_1E - k_2I + k_3D \quad . \tag{15}$$

But (15) cannot be estimated with the specification of D given in (12). A test of (14) against (15) is not possible. It cannot therefore be determined which, if any, of the parameters k_1, k_2 or k_3 is 0. In other words, using (14) results in estimates of c_1 and c_2 that include the possible independent contributions of E and I on the intention to quit.

It is possible, however, to estimate the equation

$$y = g_0 + g_1E \tag{16a}$$

and

$$y = h_0 - h_1I \tag{16b}$$

and compare the coefficients g_1 and h_1 to c_1 and c_2. If c_1 and c_2 are greater than g_1 and h_1 this reveals a phenomenon where the partial effect of education and income will be greater than the gross effect. This suppressive phenomenon can most reasonably be interpreted to

reveal a discrepancy effect--that the joint operation of education and income through the difference is an important explantory variable.

The measures of personal constraints will also be used additively below, that is, if P is a measure of personal constraints we assume

$$y = c_1 + c_2E - c_3I - c_4P \quad . \tag{17}$$

Our measures of personal constraints correlate with both education and income. Hence no final conclusion about the size of the coefficients should be made unless the full equation (17) is used. Equation (17) will be used first in the analysis of the intention to quit and then in the analysis of the actual quits. A similar linear model will also be used in the analysis of layoffs. Despite identification problems, this simple model is useful as a start, and the derivation of (17) is of assistance in the interpretation of results.

V. The Intention to Quit

Overall 12.5 percent of the whites and 13.5 percent of the blacks intended to quit their jobs. Equations (16a) and (16b) were estimated using the logit of the percentage looking for a job as the dependent variable, and the maximum likelihood procedure developed by Nerlove and Press (1973) to estimate the coefficients for the independent variables, education and income. The results for

(16a), with confidence intervals in parentheses, are

whites $y = \underset{(-2.600 \quad -2.305)}{-2.450} + \underset{(.079 \quad .126)}{.108E}$ (18a)

blacks $y = \underset{(-3.223 \quad -2.757}{-2.984} + \underset{(.290 \quad .39[illegible])}{.340E}$ (18b)

For both blacks and whites the effect is positive: the higher the education of the respondent, the more likely it would be that he is looking for a job. The effect of education on blacks is substantially higher than it is for whites.

Turning now to the income equations, the results are

whites $y = \underset{(.574 \quad .869)}{.724} - \underset{(-.072 \quad -.065)}{.069I}$ (19a)

blacks $y = \underset{(1.163 \quad 1.620)}{1.398} - \underset{(-.95 \quad -.082)}{.088I}$ (19b)

The effect of income is negative for both groups, and again, the effect is higher for blacks than it is for whites. Both for education and income the effects are significantly different from 0.

The effects of education and income on the intention to quit an underestimated in equations (18) and (19) if there is a discrepancy effect of resources and returns as shown above. The next step is therefore to introduce the two variables simultaneously, that is, estimate equation (14) for the two groups.

whites $y = \underset{(1.158 \quad 1.454)}{1.308} + \underset{(.139 \quad .197)}{.169E} - \underset{(-.107 \quad -.100)}{.104I}$ (20a)

blacks $y = \underset{(2.731 \quad 3.203)}{2.973} + \underset{(.369 \quad .487)}{.430E} - \underset{(-.176 \quad -.163)}{.169I}$ (20b)

Given a person's income, the higher his education, the more likely he is to consider a job shift; or, given his education, the higher his income, the less likely it is that he will consider a job shift. Compared to the estimates of the gross education and income coefficients, the partial effects are substantially higher for both groups. Only for the coefficients for education of blacks does the confidence interval of the gross effects and the partial effects not overlap. There is thus clear evidence that the effect of education in considering a job change is greater when a person's income is taken into account than it is when seen in isolation and vice versa. The joint influence of education and income, that is, the discrepancy between those two measures of resources and returns, appears to be an important determinant of the intention to quit a job, as argued above.

Both partial effects are greater for blacks than they are for whites. This means that the coefficient to b in equation (5) appears to be larger for blacks than for whites. It was argued in our earlier discussion that this coefficient should be dependent on the opportunities for better jobs: The more favorable these opportunities are, the greater will be the effect of the discrepancy on the intention to quit. From this argument it follows that blacks should have more opportunities for better jobs than whites. This is a finding that can be explained in several ways.

Blacks in general have worse jobs than do whites. Hence more jobs will be better than current jobs for blacks than for whites. If blacks have the same chance of getting access to vacant jobs as do whites, or believe they do, then the opportunities for better jobs will

indeed be more ample for blacks than for whites. We are dealing with the intention to quit, and the result then follows if it is assumed that blacks have the same appraisal of their possibilities for getting access to better jobs as whites.

This interpretation assumes an interaction between the level of return and the effect of a discrepancy on the intention to quit; so that the lower the current returns, the greater the effect of a discrepancy on the intention to quit, because the likelihood is greater that some other job will provide a better return. Equation (5) accordingly is misspecified, but an estimation of the model that does include such an interaction seems difficult, with no direct measure of the discrepancy available.

An alternative explanation is derived from considering the measures of resources and returns used. Clearly, education is not the only characteristic relevant for a person's value in the job market, and income is only one of the returns persons obtain from their jobs. This means that the perceived discrepancy between income and education is only a fallible indicator of the true perceived discrepancy between resources and returns. If, however, the discrepancy between education and income is a better indicator of the actual perceived discrepancy for blacks than it is for whites, then the result follows, for D is measured with greater error for whites than it is for blacks. Education should then be perceived as a more important characteristic for one's chances in the job market by blacks, and income a more salient return. There is some evidence that the latter indeed is the case, for blacks seem to maximize income over prestige,

in status attainment (Coleman, Berry and Blum, 1972). The missing information on resources and returns other than education and income prohibits a direct test of this explanation.

A third explanation needs to be explored. Age is correlated with both education and income and the estimates presented above are therefore possibly biased. Age is also assumed to be a constraint on the likelihood of undertaking a job shift, and the result therefore could reflect differences in the age distribution of blacks and whites. An estimation that includes age and the other available measures of personal constraints should therefore be attempted.

Age was expected to have a nonlinear relationship with the intentions to quit, based on other research (Sørensen, 1975). To improve the fit of the equation, polynomials in age were therefore introduced. Age square made a significant contribution to the likelihood ratio, but higher powers did not; that is, the relationship we find is

$$y = -b_1 a + b_2 a^2 \quad . \tag{21}$$

This means that the effect of age declines with age, as (21) can be seen as a solution to the differential equation

$$\frac{dy}{dA} = -b_1 + 2b_2 A \quad . \tag{22}$$

With coefficients of opposite signs equation (22) shows that the influence of age as a determinant on job shift declines with age, and the effect in fact may become positive, if $-b_1 < 2b_2 A$.

Adding A and A^2 to the equation, a dummy variable M, measuring marital status (with 0 equal to unmarried, 1 equal to married) and a variable C measuring the number of children in the household gave these results:

whites $y = 2.015 + .096E - .045I - .065A + .0003A^2 - .645M - .033C$
(1.861 2.163) (.066 .125) (-.049 -.042) (-.070 -.061) (.0002 .0004) (-.809 -.486) (-.111 -.039) (23a)

blacks $y = 4.255 + .329E - .134I - .077A + .0004A^2 + .203M - .110C$
(4.008 4.491) (.267 .388) (-.141 -.128) (-.084 -.070) (.0002 .0006) (-.063 .457) (-.204 -.027) (23b)

Age has the expected negative effect that decreases over time. To be married acts as a constraint for whites but has no effect on blacks. Number of children acts as a constraint both for blacks and whites. The confidence intervals for the number of children overlapped for blacks and whites, indicating that the effect of these constraints is similar for the two groups. The difference in the effect of being married on the intention to leave the job is difficult to interpret.

The introduction of age on the other constraints reduces the partial coefficients for both education and income. It can be shown that the reduction is primarily due to the introduction of age into the equation. Hence age correlates with the size of the discrepancy as measured by education and income, and the results presented above

without age included in the equation presumably were biased upward. However, a firm conclusion about the relative importance of age on the size of discrepancy between education and income cannot be reached from equations (23a) and (23b). Age is assumed partly to measure increasing constraints on the ability to move, but age is also a proxy for the size of the discrepancy as a result of the very phenomenon we are analyzing. Career processes are produced by job shift, and to the extent that these shifts are voluntary they obviously should make a discrepancy between resources and returns less likely to occur, the older the person. In other words, the older a person, the more time he has had to insure the highest possible returns on his occupational resources. Age therefore is colinear with the difference between education and income, partly because the two quantities are measuring the same thing. The reduction in the coefficient to education and income produced by the introduction of age in the equation may therefore not represent a reduction in bias. On the contrary, if age does not measure personal constraints, it is the coefficient to age that is biased, since age then cannot be said to represent the causal variable.

Age measures the discrepancy between resources and returns better if persons in their careers are able only to undertake voluntary job shifts that increase the occupational returns from their resources. The reductions in the size of the coefficients to education, caused by the introduction of age in the equation, is

somewhat greater for whites than for blacks (the coefficients to education for blacks in equations (23) and (20) in fact overlap). This result then indicates that the career process of blacks may be less regular; that is, in their careers blacks are more often exposed to a shift that does not reduce a discrepancy between resources and returns, or increase it. This would make the correlation between age and the discrepancy between resources and returns less in magnitude for blacks and hence would produce the observed result. The analysis of the actual shifts in layoffs should enable us to evaluate this interpretation further.

VI. Actual Quits

In the 1971 interview, 12.5 percent of the whites and 13.5 percent of the blacks indicated that they were looking for a new job. In the 1972 interview, 8.5 percent of the whites and 6.7 percent of the blacks stated that they had actually quit their jobs in the preceding year. One of the interpretations given to the larger effect of a discrepancy on intention to quit for blacks was that blacks, because of their generally worse jobs, have more opportunities for better jobs, and therefore blacks are better able to realize their intentions to quit. This interpretation can be directly tested, of course, by regressing actual quits on intentions to quit:

$$\text{whites}\quad Q = \underset{(-2.454\ \ -2.807)}{-2.262} + \underset{(.964\ \ 1.639)}{1.312Y} \qquad (24a)$$

$$\text{blacks}\quad Q = \underset{(-3.148\ \ -2.523)}{-2.822} + \underset{(.342\ \ 1.573)}{1.003Y} \qquad (24b)$$

In equation (24a) and (24b), Q denotes actual quits--coded 1 if the person did quit, 0 if he did not (persons laid off are , as mentioned, excluded from this analysis). Y is, as before, the intention to quit.

Clearly, blacks are not better able to realize their intentions to quit than are whites. The interpretation in terms of job opportunities is not supported when actual opportunities are considered, although it still may be a valid explanation for the greater effect of a discrepancy between income and education found before, if it is argued that blacks misperceive their opportunities more than do whites.

The phenomenon of partial effects being greater than gross effects, demonstrated for the intention to quit, can also be established for actual quits. Presumably the discrepancy explanation is then also valid for actual quits. The partial effects of education and income, when taken together, are shown in equations (25a) and (25b).

$$\text{whites} \quad Q = \underset{(3.845 \;\; 4.199)}{4.026} + \underset{(.133 \;\; .203)}{.169E} - \underset{(-.190 \;\; -.181)}{.185I} \qquad (25a)$$

$$\text{blacks} \quad Q = \underset{(3.908 \;\; 4.538)}{4.237} + \underset{(.082 \;\; .259)}{.175E} - \underset{(-.211 \;\; -.194)}{.202I} \qquad (25b)$$

Black-white differences in the partial effects of education and income are in the same direction as before. A discrepancy between resources and returns seems to have a greater effect for blacks than for whites: This is possibly because the discrepancy between education and income is a better measure of the discrepancy between resources

and returns for blacks than it is for whites, or possibly because more jobs are better for blacks than for whites, although this just has been shown to be a dubious contention. The difference between blacks and whites is less pronounced than when the intention to quit was analyzed; confidence intervals to the partial effects of education in fact overlap. Subsequent analysis will however show that the results of equation (25) in fact are quite misleading for blacks.

Compared with the analysis of the intention to quit, it is the case for whites that the partial effects of education are the same whether the intentions or the actual quits are considered. The partial effect to income is significantly higher for actual quits though. For whites, income seems to become a more important consideration when making the final decision about quitting than when forming the intention to quit.

For blacks it is also the case that the partial effects of income are greater for an actual quit than for the intention to quit. The effect of education is different for blacks too: It is substantially lower. Education appears to be a less important resource for blacks than they perceive it to be when forming their intentions to quit, and income is an even more important return.

The introduction of age and other measures of personal constraints has an effect on the coefficient for whites to education and income similar to the one found in the analysis of intentions to quit, but quite a different impact on the result for blacks.

$$\text{whites } Q = \underset{(5.515\ \ 5.878)}{5.700} + \underset{(.036\ \ .109)}{.074E} - \underset{(-.141\ \ -.132)}{.136I}$$

$$+ \underset{(-.089\ \ -.078)}{-.084A} + \underset{(.0001\ \ .0004)}{.0003A^2} - \underset{(-.848\ \ -.457)}{.647M} + \underset{(-.060\ \ .118)}{.033} \qquad (26a)$$

$$\text{blacks } Q = \underset{(6.095\ \ 6.742)}{6.431} - \underset{(-.101\ \ .087)}{.002E} - \underset{(-.193\ \ -.175)}{.184I} - \underset{(-.046\ \ -.026)}{.036A}$$

$$+ \underset{(-.0009\ \ -.0004)}{-.0006A^2} - \underset{(-1.226\ \ -.505)}{.849M} + \underset{(.073\ \ .257)}{.172C} \qquad (26b)$$

For whites the introduction of age in the equation reduces the partial effect of education and income. As in the analysis of the intention to quit, this may not necessarily mean that the coefficient in equation (25a) is biased seriously upwards. Age may partly be a proxy for the expected decline in the discrepancy between resources and returns that a career process characterized by voluntary job shifts should produce over time. The effects of being married and the number of children are very similar to the results from the analysis of the intention to quit--their values are nearly identical. The introduction of age does not change the conclusion derived from equation (23a) in relation to (25a) with respect to the increased importance of income for actual quits. Age itself also has a somewhat higher effect on the actual quit than on the intention to quit.

For whites the formation of the intention to quit and actual quit basically seems to take place according to the same mechanism. Income and age are somewhat more important for actual quits, but the size and magnitude of coefficients follow the same pattern in the

two cases. It is reasonable to conclude that whites form their intention to quit on the basis of an evaluation of their occupational resources in relation to their occupational returns and the constraints imposed upon them. But this is clearly not the case for blacks, as equation (26b) indicates.

With the introduction of age in the equation, the partial effect of education fails to reach significance. Age itself shows up with a negative effect, that is accelerating as the coefficient of A^2 indicates. Marital status has a negative effect. Number of children has a positive effect, in contrast to the insignificant effect found for whites. The patterns of effect are very different from other results seen so far. An explanation in terms of quits being determined by current returns relative to resources seems hard to justify. Rather, the likelihood of quitting is determined for blacks primarily by age and the current economic return relative to need. The effect of number of children is positive, not negative as would be expected if these variables acted as personal constraints, thus indicating that an increase in income needs with size of household acts as an impetus, not a constraint, on the likelihood of quitting.

The similarity of results for blacks and whites given in equation (25a) and (25b) was spurious. The positive partial effect of education in equation (25a) is presumably due to better education among younger, unmarried blacks, but level of education is in itself of no importance for blacks' voluntary shifts. While the same mechanism seems to account for the intention to quit for blacks and whites, only whites carry out the actual quit according to this mechanism. Blacks do

not seem able to quit when it would increase their income return on their education, even though they in fact appear to be more sensitive to the discrepancy between income and education than are whites, and such a discrepancy appeared to be less age-dependent for blacks than for whites.

A source of income difference between blacks and whites is identified: The education of blacks is insignificant for the gains they may realize from job shift, and they are not able to form occupational careers where increasing occupational returns on occupational resources are obtained over time. Further insight into these disadvantages of blacks can be given in the analysis of layoffs.

VII. Layoffs

Occupational resources in relation to occupational returns were argued to be a determinant of quits, because they determine the size of the gain a person may realize in a quit. In the same way, resources in relation to returns may be argued to determine layoffs because lower resources relative to current returns, especially wages, should make the employee more expendable to the firm. The mechanism would imply negative partial coefficients to measures of resources and positive partial coefficients to measures of returns in an additive model for layoffs like the one used in the analysis of quits. This is the opposite pattern than the one found for quits.

With the available measures of resources--that is, education--it is, however, doubtful that this pattern will come out. Education is correlated with occupational differences in job security; higher education may therefore, in fact, provide protection against quits, while lower education increases exposure to quits, irrespective of wages. Layoffs are made on the decision of the employer, not the employee, as are quits; to the employer, wages may in fact be the best indicator of productivity, irrespective of other characteristics of the employee. While formally plausible, it is doubtful, with the available measures, that a discrepancy explanation will account for layoffs. Results of an analysis of layoffs using the same variables as before confirm this doubt:

whites $L = \underset{(2.486\ \ 2.941)}{2.721} - \underset{(-.120\ \ -.021)}{.068E} - \underset{(-.103\ \ -.091)}{.097I} - \underset{(-.062\ \ -.050)}{.055A}$

$$\underset{(-.0004\ \ -.0002)}{-.0003A^2} - \underset{(-.550\ \ -.067)}{.230M} + \underset{(-.032\ \ .169)}{.074C} \qquad (27a)$$

blacks $L = \underset{(1.737\ \ 2.268)}{2.011} + \underset{(-.015\ \ .133)}{.062E} - \underset{(-.118\ \ -.104)}{.111I} + \underset{(.045\ \ .061)}{.053A}$

$$\underset{(-.0021\ \ -.0012)}{-.0013A^2} - \underset{(-.844\ \ -.244)}{.532M} - \underset{(-.126\ \ .0551)}{.029C} \qquad (27b)$$

Here L denotes the logit of the probability of being laid off, and the notation is otherwise as before.

Only 4.6 percent of the whites were laid off in the year 1971-72. The probability of being fired is strongly dependent on age, as A^2 also has a negative sign. Also, education provides a protection against being fired as does high income. Marital status has a negative effect,

which might indicate some discrimination of employer against unmarried workers, or that married workers somehow are more productive than unmarried workers. Number of children has no importance. Not unexpectedly, it is young, unmarried whites with low education and income who are most likely to get fired.

For blacks the picture again is significantly different. The probability of getting fired is almost twice as high for blacks as for whites--9.0 percent. Education provides no protection for blacks against getting fired; its effect is not significant. Age has a positive effect that, however, is decelerating over time. It appears that it is the middle-aged blacks who are most likely to get fired and not the youngest, as with whites. As was the case with whites, marriage is a protection against getting laid off, and income also affects the probability of being laid off the same way. The difference between blacks and whites in the effect of personal characteristics on the probability of being laid off is again an important finding for the explanation of the differences in income attainment of blacks and whites. That the likelihood of getting fired increases with age for blacks means that blacks more often involuntarily lose whatever experience and on-the-job-training that they may have received. The insignificant effect of education means that highly educated blacks are just as likely as low-educated blacks to experience a loss in occupational returns, especially income. In the analysis of quits, it was found that blacks were not able to undertake shifts that increased their return on their education. Clearly, education will

not influence the career of blacks by much, and their careers are unstable, as only the very young blacks are able to undertake voluntary quits, while the likelihood of getting fired increases with age.

VIII. Conclusion

In the introduction to this paper it was claimed that the analysis of job shifts may give an important insight into the process of status and income attainment, especially the sources of variation in the parameters of the attainment models used in other research. We have attempted to implement this claim here by analyzing voluntary and involuntary job shifts for blacks and whites as a function of income, education, and family characteristics.

Our results demonstrate a pattern where blacks are systematically disadvantaged in their income attainment process in relation to whites. While both blacks and whites form their intention to quit such that they are likely to quit when they can realize an increased income return on their education, blacks are in fact not able to carry out a voluntary shift according to these considerations. Blacks' voluntary job shifts are most likely to occur when the respondents are young, and the income needs great, not when it, in view of the relation of education to income, should be advantageous for them to do so. This is despite the finding that blacks seem more sensitive to a discrepancy between education and income (or the discrepancy between occupational resources and returns is better measured by income and

education for blacks) when forming intention to quit, and despite the finding that the occurrence of a discrepancy appears less dependent on age for blacks than for whites, due to less regular careers for blacks.

The results of the analysis of layoffs show that this pattern is only reinforced by involuntary shifts. While education and age provide some protection of whites against getting fired, education gives no such protection to blacks and the likelihood of getting fired increases with age. Blacks are forced out of their jobs when they can least afford it in terms of their careers.

Taken together, these results indicate that the well-known difference in occupational attainment for blacks and whites is not only due to lower levels of occupational resources for blacks, but to low returns on these resources due to the disadvantages blacks encounter on the job market, where they are not able to increase their return on resources over age as are whites. While our analysis has only been able to use inadequate measures of occupational resources of persons and occupational returns, and while the model used here has left some interpretative alternatives open, our results point dramatically to such a pattern of disadvantages for blacks.

NOTES

[1]In controversies over the magnitudes of coefficients in status attainment research, most attention has been focused on problems of measurement, where different assumptions about the error structure produce different results [see Jencks et al. (1972) and Bowles (1972)]. This leaves the question addressed here--what are the substantive sources of variation in the parameters--unanswered.

[2]An analysis of job shifts on the same data set used here but with a different perspective has been carried out by David (1973).

[3]The version of the program used here is an earlier version of the program described in Nerlove and Press (1973).

REFERENCES

Bowles, Samuel. "Schooling and Inequality from Generation to Generation." Journal of Political Economy 80 (May/June 1972): S219-S251.

Coleman, James S.; Berry, Charles; and Blum, Zahava D. "White and Black Careers During the First Ten Years of Work Experience: A Simultaneous Consideration of Occupational Status and Income Changes." Social Science Research 1 (1972).

Coleman, James S.; Blum, Zahava D.; Sørensen, Aage; and Rossi, Peter H. "White and Black Careers During the First Decade of Labor Force Experience. Part I: Occupational Status." Social Science Research 1 (1972): 243-70.

David, Martin. "The Dynamics of Family Labor Supply Decisions: Quit and Relocation as a Family Unit Decision." Madison, Wis.: Social Systems Research Institute Workshop Series, 7325. Revised November 1973.

Duncan, Otis Dudley. "Inheritance of Poverty or Inheritance of Race?" In On Understanding Poverty, ed. Daniel P. Moynihan. New York: Basic Books, Inc., 1969. pp. 85-110.

Goodman, Leo A. "A General Model for the Analysis of Surveys." American Journal of Sociology 77 (1972): 1035-1086.

Nerlove, Marc, and Press, S. James. "Univariate and Multivariate Log-Linear and Logistic Models." Prepared for the Economic Development Administration and the National Institutes of Health. R-1306-EDA/NIH. Santa Monica, Cal.: The Rand Corporation, December 1973.

Siegel, Paul M. "On the Cost of Being a Negro." Sociological Inquiry 35, No. 1, 1965.

Sørensen, Aage B. "The Organization of Activities in Time." Demography (August 1975) at press.

Theil, H. "On the Estimation of Relationships Involving Qualitative Variables." American Journal of Sociology 76 (1970): 103-54.